

# COUNTRY ANALYSIS BRIEFS

## Russia

Last Updated: January 2006

### Background

***Russia is important to world energy markets because it holds the world's largest natural gas reserves, the second largest coal reserves, and the eighth largest oil reserves. Russia is also the world's largest exporter of natural gas, the second largest oil exporter, and the third largest energy consumer.***

In 2004, Russia's real gross domestic product (GDP) grew by approximately 7.1 percent, surpassing average growth rates in all other [G8](#) countries, and marking the country's sixth consecutive year of economic expansion. Russia's economic growth over the past five years has been fueled primarily by energy exports, given the increase in Russian oil production and relatively high world oil prices during the period.

Russia's economy is heavily dependent on oil and natural gas exports, making it vulnerable to fluctuations in world oil prices. According to an IMF [study](#), a \$1 per barrel increase in Urals blend oil prices for a year is estimated to raise federal budget revenues by 0.35 percent of GDP, or 1.8 billion—a fact that underlines the influence of oil on Russia's fiscal position and its vulnerability to oil market volatility. The government's stabilization fund, a rainy-day storage facility for windfall oil receipts that came into effect on January 1, 2004, is designed to help offset oil market volatility. Even before oil prices reached near-record levels, the fund was expected to be worth almost \$52 billion by the end of 2005, or about 7 percent of the country's GDP. Raw materials, such as oil, natural gas, and metals, dominate exports and account for over two-thirds of all Russian export revenues.

As Russia's stabilization fund grows, using it to solve social problems or to buy other assets outside of Russia may become more likely. Although estimates vary widely, the [World Bank](#) has suggested that Russia's oil and gas sector may have accounted for up to 25% of GDP in 2003 while employing less than 1% of the population. The Russian government has made decoupling economic growth from commodity exports a priority. But, nationalizing parts of the energy sector (see discussion on [Oil Industry Sector](#) below) has come at the expense of Russian oil and natural gas producers, who are seeking to grow in a more liberalized marketplace, as well as Russia's external trading partners, who are pressuring the country to synchronize its policies with those in Western Europe and North America. Key to these efforts will be breaking up the monopolies that control the natural gas and electricity industries.

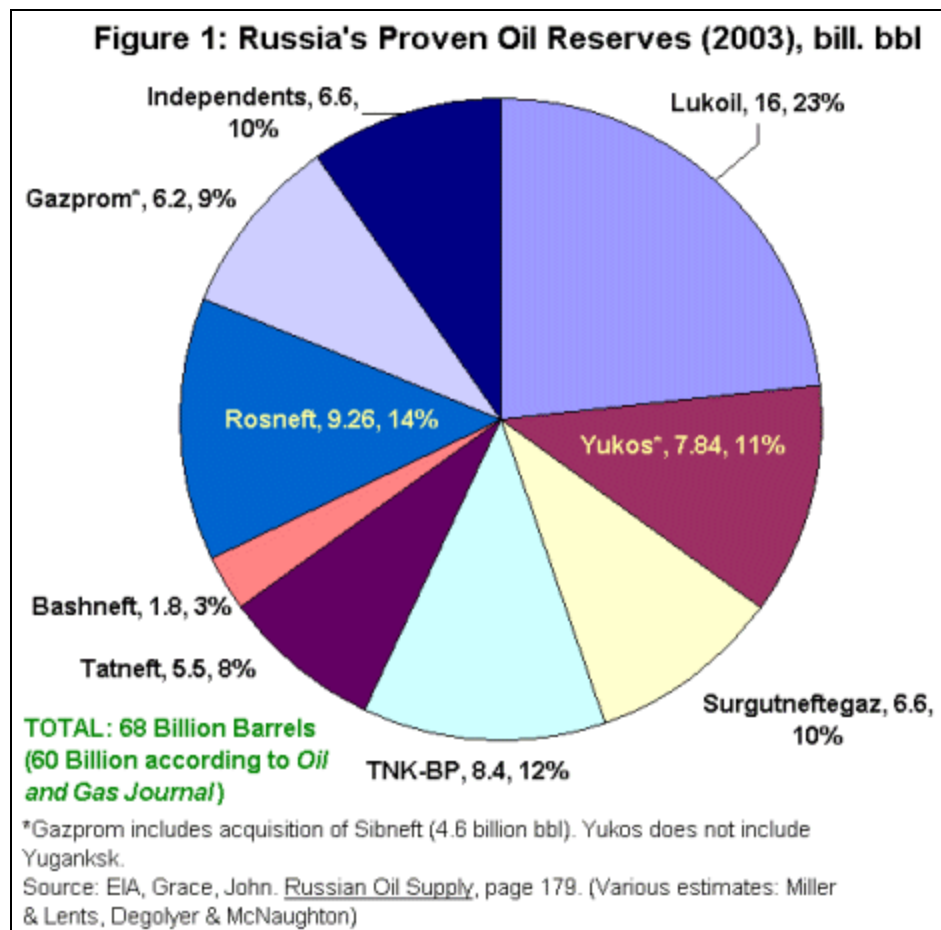
Kremlin policy makers continue to exhibit an inclination to advance the state's influence in the energy sector, not to reduce it. Taxes on oil exports have been raised significantly and private oil companies complain that the higher export taxes are hindering efficient allocation of profits into exploration and development. State-owned export facilities have grown at breakneck pace, while private projects have progressed more slowly or have been met with roadblocks by state-owned companies Gazprom and Transneft (see [Oil Exports](#)); Rosneft, the state-owned oil company has obtained the 1-million-bbl/d Yukos unit of Yuganskneftegaz; and leading industry figures have come under criminal investigation by Russia's Procuracy General (see [Oil Industry Structure](#)).

### Oil

#### Reserves

According to the Oil and Gas Journal, Russia has proven oil reserves of 60 billion barrels, most of which are located in Western Siberia, between the Ural Mountains and the Central Siberian Plateau. In addition to roughly 67 billion barrels of probable and possible oil reserves, a 1998 USGS survey estimated that undiscovered, technically feasible, conventional reserves were larger than those of any other country in the world.

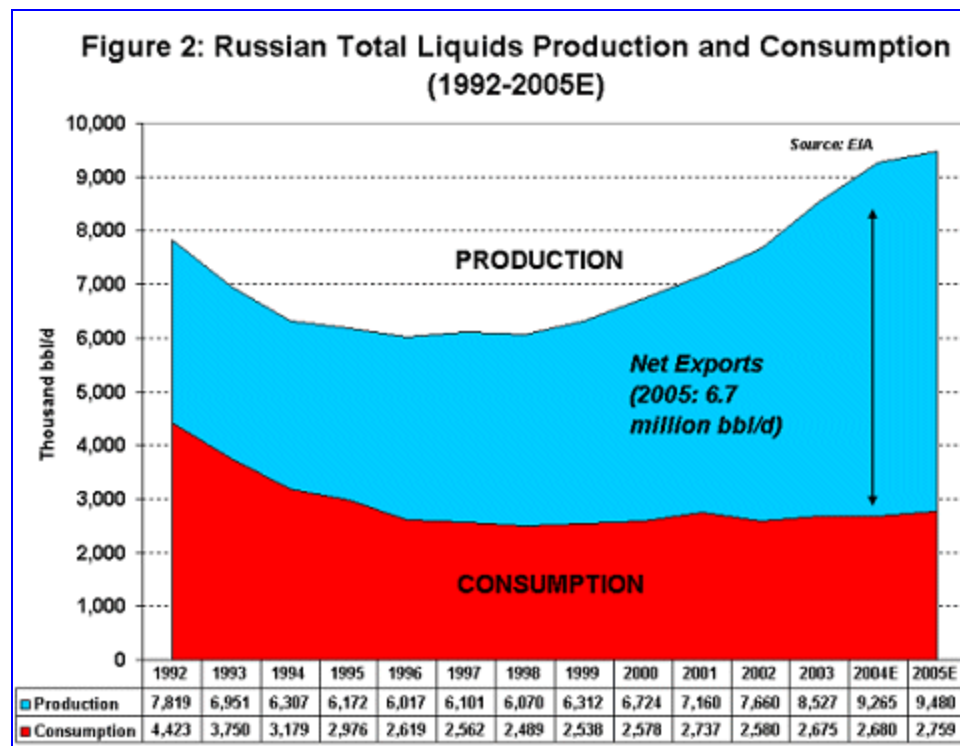
***Russia is a major world oil producer, second only to Saudi Arabia. Following the collapse of the Former Soviet Union (FSU), Russia's oil output fell sharply, and has rebounded only in the last couple years.***



#### Production

In the 1980s, the Western Siberia region, also known as the "Russian Core," made the Soviet Union a major world oil producer, allowing for peak production of 12.5 million barrels per day in 1988. Following the collapse of the Soviet Union in 1991, Russia's oil production fell precipitously, reaching a low of roughly 6 million bbl/d, or around one-half of the Soviet-era peak (see Fig. 1). Several other factors are thought to have caused the decline, including the depletion of the country's largest fields due to state-mandated production surges and the collapse of the Soviet central planning system.

A turnaround in Russian oil output began in 1999. Many analysts have attributed the rebound in production to the privatization of the industry following the collapse of the Soviet Union. The privatization clarified incentives and increased less expensive production. Higher world oil prices ([oil prices tripled between January 1999 and September 2000](#)), the usage of technology that was standard practice in the West, and the rejuvenation of old oil fields also helped raise production levels. Others partially attribute the increase to after-effects of the 1998 financial crisis, the subsequent devaluation of the ruble, and the fall in oil prices.



By 2005 Russian total liquids production averaged almost 9.5 million bbl/d (9 million bbl/d of which was crude oil)—a 2.5 percent increase over 2004. This growth rate was down from annual growth of roughly 10 percent in 2004 and 2003. These production levels have made Russia the world's second largest producer of crude oil, behind only Saudi Arabia.

The short-term outlook for Russian oil production growth is particularly unclear due to a lack of good seismic data and a lack of exploration in major potential producing areas during the last decade. Government taxation of production and export revenues along with the continued lack of clarity concerning the ownership of subsoil resources has also contributed to lower forecasts for 2006. Russia's large oil resource base (President Vladimir Putin says it is much larger than the oft-cited 60 billion barrels) should enable the industry to increase production during a high price environment. However, even the Russian Ministry of Industry and Energy and Ministry of Economic Development and Trade have both reduced their outlook for oil supply growth from 4-5 percent per year in 2006 to 2-3 percent. In the last year, major energy agencies as well as the investment community have become increasingly pessimistic about oil supply growth in Russia. Increasing export and production taxes continues to hinder upstream development and decreases returns from applying new technology onto old fields.

In the upcoming decade, a few major oil fields will contribute to most of Russia's supply growth and others will contribute to decreasing production from mature fields. Production from mature oil fields has a major role in the recent slowdown in Russian oil supply growth. Some of these fields are listed in Table 1 below. "Pre-peak" fields, which have come online in the last decade, can add between 0.9-1.5 million bbl/d to Russian supply according to a recent [analysis](#) of Russia's oil supply.

New field developments will produce almost all of Russia's annual oil growth in the next five years and will likely produce more than half of the country's oil in 2020. In the next 5 years, new field developments at Lukoil's Middle Caspian project (at Kurmangazy in 2006), the [Sakhalin Island](#) projects, the Shell Joint Venture's West Salymkoye project, Lukoil/ConocoPhillips's TimanPechora project, Rosneft/Gazprom's Prirazlomnoye project, and Rosneft's Vankorskoye and Komsomolskoye will help stem production losses at older fields.

In the past, private firms have led much of the upstream development in Russia; but as the state nationalizes these firms, sustained improvements to exploration and development become less certain. Achieving continued growth at post-peak fields will become more problematic as oil companies run out of easy and less costly opportunities to manage the rate of decline.

#### [Russia's Oil Balance](#)

Over 70 percent of Russian crude oil production is sent directly abroad for export, while the remaining 30 percent is refined locally. According to the latest data for November 2005, roughly 1.4 million bbl/d of Russia's oil exports are sent via the multiple-branch Druzhba pipeline to

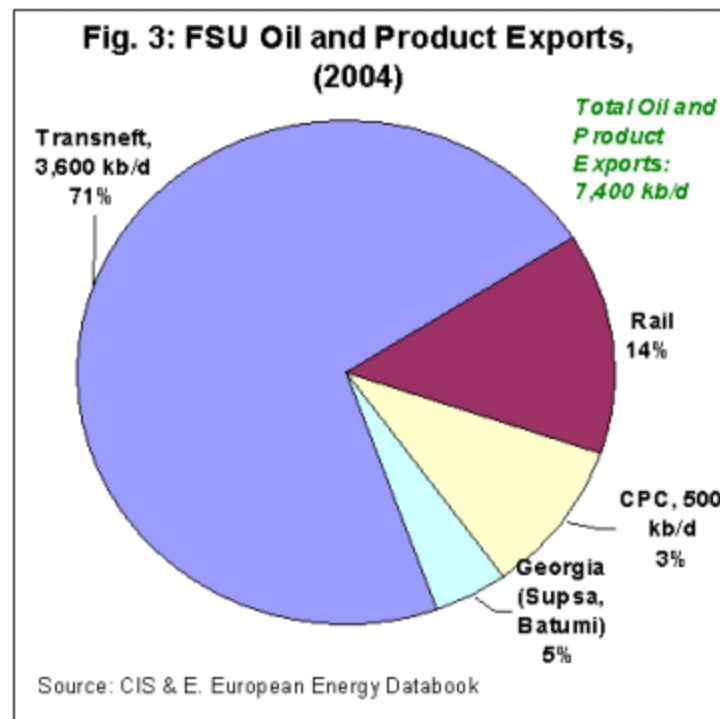
Belarus, Ukraine, Germany, Poland, and other destinations in Central and Eastern Europe (including Hungary, Slovakia, and the Czech Republic). The remaining crude oil exports are sent to maritime ports in the Black Sea and Baltic Sea and are sold on world markets. Also, because of higher world oil prices recently, almost 170,000 bbl/d of Russia's oil is transported via railroad (see Fig. 2). Most of Russia's product exports consist of [fuel oil](#) and [diesel fuel](#), which are used for heating in European countries and, on a very small scale, in the United States.

TABLE 1: Pre- and Post-Peak Russian Oil Fields			
OIL FIELD	OWNER	Basin	Cum. Depletion (in 2000)
<b>Pre-Peak Russian Fields</b>			<b>Percent</b>
Priobskoye	Rosneft (fmr. Yukos)	W. Siberia	1
Tevlin-Russinkoye	Lukoil	W. Siberia	26
Tyanksoye	Surgutneftegaz	W. Siberia	5
Sugmutsokoye	Gazprom (fmr. Sibneft)	W. Siberia	12
Sporyshevskoye	Gazprom (fmr. Sibneft)	Yamalo-Nenetsk	n/a
W. Salym	SPD: Sibir, Evikhon, Shell	W. Siberia	n/a
<i>These fields can contribute annually from 0.9-1.5 million bbl/d</i>			
<b>Post-Peak Russian Fields</b>			
Samotlor	TNK-BP	W. Siberia	68
Romashkino	Tatneft	Volga/Ural	n/a
Momontovskoye	Rosneft	W. Siberia	78
Federovskoye	Surgutneftegaz	W. Siberia	62
Lyantorskoye	Surgutneftegaz	W. Siberia	38
Pravdinsko-Salymskoye	Khantyngnasyyskneftegaz	W. Siberia	24
Vatyeganskoye	Lukoil	W. Siberia	26
Povkhovskoye	Lukoil	W. Siberia	54
S. Yagunskoye	Lukoil	W. Siberia	38
Arlan	Bashneft	Volga/Ural	n/a
John Grace estimates that these post-peak fields are declining from 1-5% per year.			
*Proved reserves according to World Petroleum Congress/Society of Petroleum Engineers (WPC/SPE), unless otherwise noted			
Sources: Grace, John. <a href="#">Russian Oil Supply</a> . Oxford Institute of Energy Studies: 2005. pp. 38.			

## Oil Exports

**Key to Russia's production growth in the upcoming decade will be the availability of viable export routes for the country's crude oil. Transneft currently has a monopoly over Russia's pipeline network.**

Expanding Russia's capacity to export oil in order to keep pace with the country's growing production is important to both Russian policy-makers and oil companies. However, the two sides are sometimes at odds over how best to boost the country's export capacity. Crude oil exports via pipeline fall under the exclusive jurisdiction of Russia's state-owned pipeline monopoly, [Transneft](#). But bottlenecks in the [Transneft system](#) make the company's export capacity incapable of meeting oil producers' export ambitions. Although Russia produces almost 7 million bbl/d of liquids (in net) for export, only about 4 million bbl/d can be transported by major trunk pipelines; the rest must be shipped by rail and river routes. Most of the 4 million bbl/d transported via alternative routes are petroleum by-products (see Fig. 2, which includes some intrastate transport). Some of the crude oil export capacity deficit is also overcome by exporting these petroleum products. However, all of these alternate methods of exporting oil are much more costly than shipment via pipeline and could become less economical if world oil prices fall.



The Russian government and Transneft have acknowledged the capacity problem and have taken steps towards developing new export infrastructure. At issue, however, is not only the direction and scope of enhancements to the country's export infrastructure, but also the potential role that private firms and investors may play in these projects, presumably at the expense of state-owned Transneft.

During the first half of 2005, Russia exported almost 4 million bbl/d of crude oil, well below predictions of 5.5 million bbl/d in late 2004 but 11 percent higher than exports during the same period of 2004. Russia also exported roughly 116,000 bbl/d to China during 2004, expects to export 160,000 bbl/d during 2005, and projects exports of 300,000 bbl/d in 2006. Under the Ministry's economic forecast, Russian oil exports could grow to around 5.8 million bbl/d in 2007, and up to 6.2 million bbl/d by 2015.

### Proposed Oil Pipeline Routes and Pipeline Expansion Projects

#### *Baltic Pipeline System (BPS)*

The BPS came online in December 2001 carrying crude oil from Russia's West Siberian and Timan-Pechora oil provinces westward to the newly completed port of Primorsk in the Russian Gulf of Finland (see [map](#)).

Throughput capacity at Primorsk has been steadily increased, reaching around 1.2 million bbl/d by September 2005. The BPS gives Russia a direct outlet to northern European markets, allowing the country to reduce its dependence on transit routes through Estonia, Latvia, and Lithuania. Unfortunately for the Baltic countries, the growth of the BPS has come at considerable cost, as Russian crude which traditionally moved through the Baltic region has been re-routed through the BPS. For example, crude oil shipments have dropped off almost 30 percent since 2000 at the port of Ventspils in Latvia. Russian authorities have stated publicly that when allocating the country's exports, precedence will be given to sea ports in which Russia has a stake over foreign ones; in other words, BPS over other Baltic ports (for more information on energy in the Baltic Sea Region, see: [Baltic Sea Region Country Analysis Brief](#))

#### *Kharyaga-Indiga and Murmansk*

**Building the pipeline to Indiga will likely be significantly delayed. Because the Russian government has given priority to the construction of the Taishet-Nakhodka pipeline, Transneft is reluctant to take on two large pipeline**

A new pipeline and deepwater tanker terminal in the Barents Sea would carry crude oil from Russia's West Siberian Basin and Timan-Pechora basin westward to Murmansk on the Barents Sea. Such a terminal would allow for 500,000 bbl/d of Russian oil exports to reach the United States via tankers within only nine days travel time, much faster than shipping from the Middle East or Africa. Liquefied natural gas (LNG) facilities at Murmansk and Arkhangelsk (to the southeast) also have been suggested, possibly allowing for natural gas exports to American markets.

Despite support for the Murmansk proposal from Russian oil companies, American oil companies,



**projects at the same time.**

and the U.S. government, Transneft (and thereby the Russian government) has approached the project with caution. In January 2005, Transneft was considering a shorter western route with a terminus at Indiga instead of Murmansk (see map above), and Transneft's CEO plainly said the Murmansk proposal had no future. Alekperov also said publicly that he believed the Murmansk project was no longer economically feasible and had not gained support from foreign or Russian private investors. At a cost of \$6 billion, the new Indiga proposal is closer to the Timan-Pechora oil fields than the Murmansk pipeline.

Building the pipeline to Indiga, where in contrast to Murmansk the port is iced over during the winter, will still not happen anytime soon. Because the Russian government has given priority to the construction of the Taishet-Nakhodka pipeline (see below), Transneft is reluctant to take on two large pipeline projects at the same time. Some Transneft officials and others have stated that Russia's expanding BP's system as well as a few other key export projects (listed below) will be sufficient to keep pace with growing Russian oil production.

*Adria Reversal Project*

Reversal of the Adria pipeline, which spans between Croatia's port of Omisalj on the Adriatic Sea and Hungary (see map), has been under consideration since the 1990s. The pipeline, which was completed in 1974, was originally designed to load Middle Eastern oil at Omisalj, then pipe it northward to Yugoslavia and on to Hungary. However, given both the Adria pipeline's existing interconnection with the Russian system, and Russia's booming production, the pipeline's operators and transit states have since considered reversing the pipeline's flow, thus giving Russia a new export outlet on the Adriatic Sea.



Connecting the Adria pipeline to [Russia's Southern Druzhba system](#) would require the cooperation of six countries (Russia, Belarus, Ukraine, Slovakia, Hungary, and Croatia). In December 2002, these countries signed a preliminary agreement on the project. Since then, however, progress has been slow moving, while the transit states wrangle over the project's details (including [tariffs](#) and environmental issues). Of the six partners, only three countries, Slovakia, Hungary, and Ukraine are fully ready to implement the reversal. Croatia is particularly worried about the environmental effects of increased oil transports from a port along its coast. The Croatian government rejected the conclusions of an environmental impact study completed in October 2005, calling it "incomplete and not based on expert knowledge." The rejection of the study's findings could keep the project from ever getting underway. Given the relative simplicity of reversing the flow should the countries come to an agreement, some analysts expect that the Adria pipeline could begin transiting roughly 100,000 bbl/d of Russian crude in the first year of reversal (less than 3% of Russian crude oil exports), with an ultimate capacity of approximately 300,000 bbl/d.

*Eastern Siberia Pacific Ocean Pipeline (ESPO): Taishet - Skovorodino - Perevoznaya Bay*

For about two years, Russian energy officials were unwilling to commit to one of two oil transit pipelines to eastern Asia. Finally, in late 2004, President Putin announced that Russia would commit to building a pipeline route from the Russian city of Taishet to Perevoznaya Bay (see map below). More recently Putin and Transneft officials have clarified that the 2,500-mile pipeline will be built in two stages, initially to the Pacific coast where a new export facility is to be constructed (see map). Russia estimates that the project will cost between \$11.5 and \$18 billion; and it will have a capacity of 1.6 million bbl/d. The first stage of the pipeline to Skovorodino will cost around \$6.6 billion; Transneft plans to borrow \$5 billion through issue of Eurobonds and \$1.6 billion through bank credits. Putin and Transneft have made the completion of the first stage a top priority and aim to have that stage of the pipeline constructed by late 2008. Oil would be shipped via rail to the Pacific coast until the second stage of the pipeline is constructed.

The route to Perevoznaya Bay is significantly more expensive than an alternative route to Daqing, China, since it covers a greater distance and involves more investment. However, the Taishet-Perevoznaya Bay route will open up a new Pacific port from which Russian oil exports could be shipped by tanker to other Asian markets and possibly even to North America. Although the Daqing option has been abandoned, it is still possible that China will import oil via the Perevoznaya route. Russian officials and Transneft executives reported in January 2005 that the Perevoznaya route would include a pipeline spur from Skovorodino (located about 30 miles from China).

Some hurdles exist to the Eastern Pipeline's plan. First, financing the project is challenging. Russia has only obtained Japanese promises of \$7 billion for the project. Also, the pipeline route passes close to the waters of [Lake Baikal](#), a UNESCO-protected site, and environmental hurdles should therefore be expected. Perevoznaya Bay is also an environmentally sensitive area for whales and environmentalists have urged the terminus be closer to the industrial port of Nakhodka. Finally, the government estimates that transportation tariffs could be roughly \$6 per barrel, but other outside analysts estimate the level at up to \$10 per barrel. It is also possible that the level of development of Eastern Siberian oil resources will not be sufficient to fill the pipeline to capacity by 2020.

#### *Alternate Oil Export Routes*

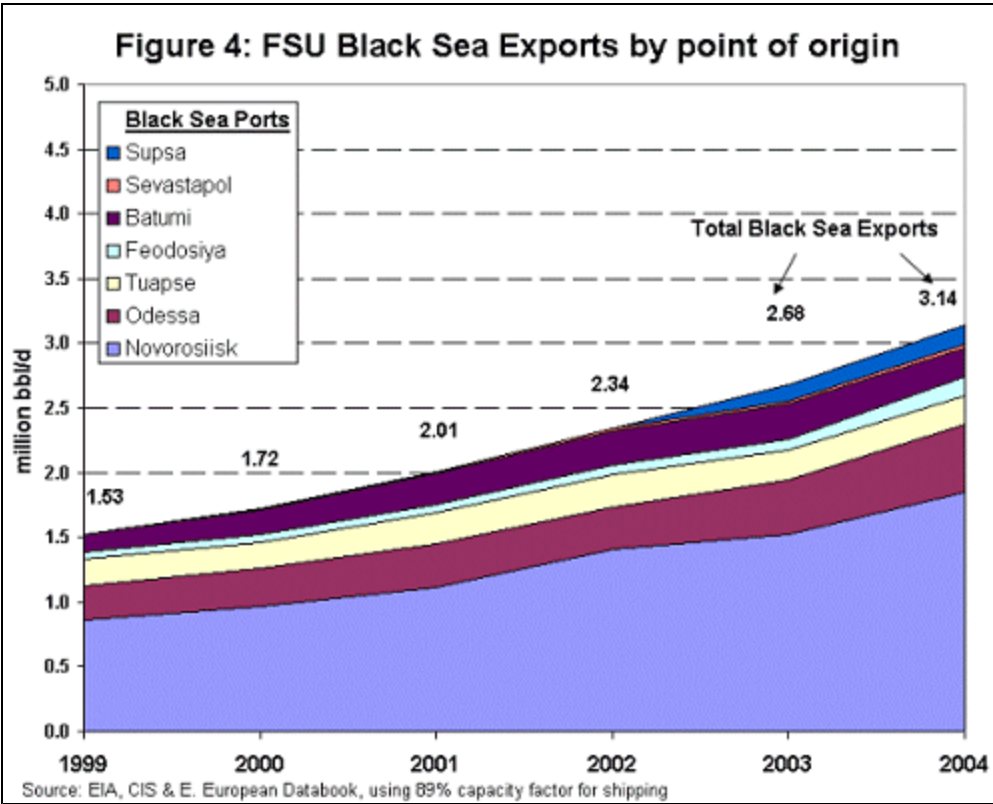
Rail exports comprise roughly 5% of Russian crude oil exports. But unless significant investment flows into expanding the Russian pipeline network's capacity, non-pipeline transported exports are poised to increase even more in the upcoming years. As China's growth continues, rail routes are the only way to provide Russian crude oil to East Asia. In the absence of a dedicated pipeline route, Russian crude oil is exported via rail to the northeast cities of Harbin and Daqing and to central China via Mongolia. Rail exports of crude oil to China will increase from approximately 200,000 bbl/d in 2005 to 300,000 bbl/d by 2006 according to China's Ministry of Railways. Outside observers have expressed concerns that the government's treatment of Yukos could affect rail exports to China since Yukos is the leading supplier of oil exports to China. However, since the auction of Yuganskneftegaz (see [Industry Structure](#)), Lukoil has taken over the role of rail supplier.



#### *Oil Shipment: Black Sea*

After Russian oil flows through the various pipelines described above, crude oil and products are shipped onward to Europe, the United States, and Asia via tanker. The bulk of Russia's oil is shipped to the Mediterranean and to Asia via tankers in the Black Sea, mostly from the port of Novorossiysk. With the opening of the BTC pipeline in early 2006 and the higher export aspirations of the CPC consortium owners (see the [Caspian](#) brief), it is now unclear how much oil will still be shipped out of the Black Sea ports. Since the economic viability of the BTC pipeline is as of yet untested, some analysts expect Novorossiysk (along with Batumi, Supsa, and Odessa) to remain at current levels (approximately 1.7 million bbl/d in 2003). Other analysts expect that if [Azerbaijan](#) does actually divert all of its oil shipments via BTC, the exports from Novorossiysk will decrease. News reports indicate a floating proposal that the Baku-Novorossiysk line might then be reversed, allowing for 250,000 bbl/d more crude oil exports to be sent from Russia to Baku and

then along the BTC route. Also, the only area of expansion in the Russian pipeline network is near St. Petersburg, and the Baku-Novorossiysk line is the only one with spare capacity.





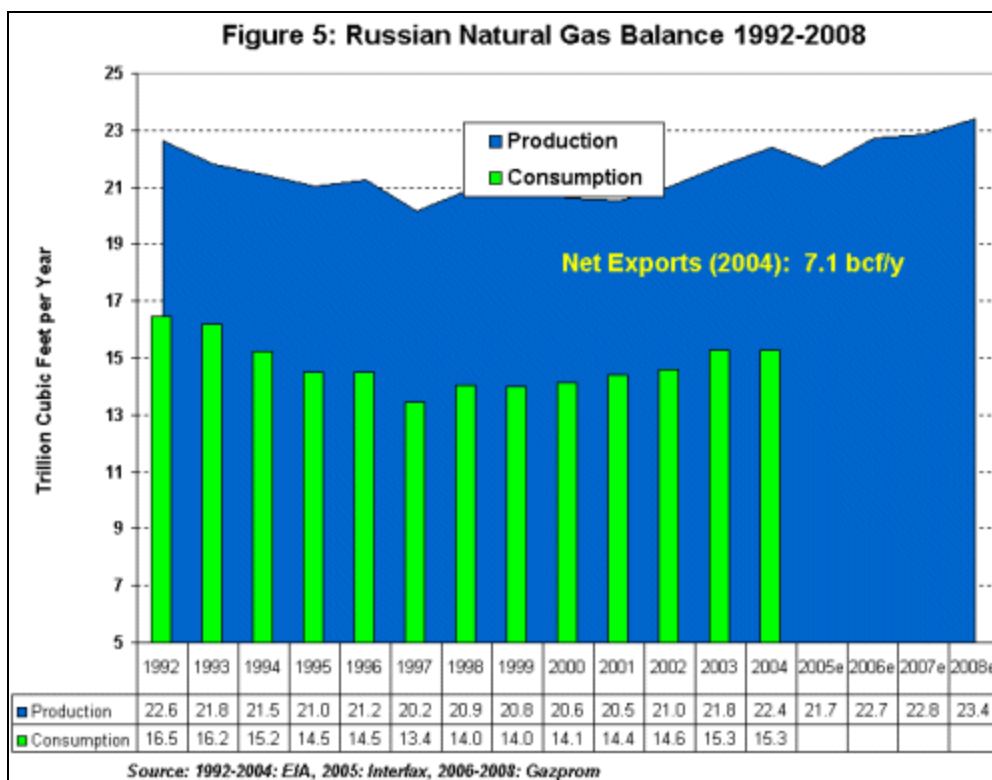
**Table 2: Major Russian Oil and Natural Gas Pipeline Projects**

<b>OIL</b>							
Name	Length (miles)	Cost (\$2005)	Current Capacity (th. bbl/d)	Expected Capacity (th. bbl/d)	Location	Completion Date	Notes
Adria Reversal Project	470		100	300	Central Europe (Hungary, Slovakia) to Croatian Adriatic Port of Omisalj	Unknown - but once approval given--> immediate	Environmental hold-up in Croatia; Unlikely to move forward
CPC - Caspian Pipeline Consortium	940	\$1.5 billion	540	1,200-1,300	Kazakhstan to Novorossiysk, RF	2006?	Some agreements made, but still held up due to Russian insistence on higher tariffs
Baltic Pipeline System (BPS)	1,600	\$500 million	1,000	1,300	Exports from Timan-Pechora region via Baltic	1st half of 2006	Latest export capacity of 1.2 million bbl/d
Kharyaga-Indiga	320	\$2-6 billion	0	500	Baltic Sea (NE of Primorsk)	undetermined	Transneft proposal. Not ice-free like Murmansk
Murmansk	various	\$6 billion	0	3,000	Baltic Sea (NE of Primorsk)	undetermined	Project for pipeline and terminal - Lukoil pipeline proposal, lost out to Indiga route
Eastern Pipeline (Taishet-Skovorodino-Perevoznaya)	2,480	\$16-18 billion	0	1,000	Linking from existing pipeline near Lake Baikal to Russian Pacific Coast	2008 (First Stage)	Pipeline to be built in 2 stages, first to Skovorodino, and then to Pacific Coast. Environmental concerns with Lake Baikal and Perevoznaya Bay
<b>NATURAL GAS</b>							
Name	Length (miles)	Cost	Current Capacity (Bcf/yr)	Expected Capacity (Bcf/yr)	Location	Completion Date	Notes
Yamal-Europe II	n/a		1,060	n/a	Second branch from Russia via Belarus and Poland via Europe	n/a	Route undetermined
Blue Stream	750	\$3.3 billion	565	same	Izobilnoye to Dzhugba (RU), under Black Sea, Samsun to Ankara (Turkey)	finished	ENI-Gazprom proposing expansions, but pipeline was completed in 2003
North Trans-Gas Pipeline (NEGP)	1,300 (737 offshore)	\$5.7 billion	0	700-1000	Russia to Finland, UK via Baltic Sea, with connections to Sweden and Germany	2010	Gas Pipeline, MOU signed in September 2005 between Europeans and Russia. Gazprom (51%), E.ON (24.5%), and BASF (24.5%) to finance

## Natural Gas

***Russia has the largest natural gas reserves in the world, but the country's aging natural gas infrastructure, and monopolistic industry have created unneeded inefficiency.***

Russia holds the world's largest natural gas reserves, with 1,680 trillion cubic feet (Tcf)– nearly twice the reserves in the next largest country, Iran. Accordingly, in 2004 Russia was the world's largest natural gas producer (22.4 Tcf), as well as the world's largest exporter (7.1 Tcf). Production during 2005 is predicted to be about the same. However, Russia's natural gas industry has not been as successful as its oil industry, with both natural gas production and consumption remaining relatively flat since independence (see Fig. 5). Moreover, Gazprom's natural gas production forecast calls for only modest growth (about 1.3%) by 2008. Russia's natural gas sector has been stunted primarily due to aging fields, state regulation, Gazprom's monopolistic control over the industry, and insufficient export pipelines. Three major fields (called the 'Big Three') in Western Siberia–Urengoy, Yamburg, and Medvezh'ye comprise more than 70% of Gazprom's total natural gas production, but these fields are now in decline. Although the company [projects](#) increases in its natural gas output between 2008 and 2030, most of Russia's natural gas production growth will come from independent gas companies such as Novatek, Itera, and Northgaz.



#### *Import and Export Markets*

Historically, the majority of Russia's natural gas exports were sent to customers in Eastern Europe. But since the mid 1980's, Russia began looking to diversify its export options. Russia continues to export significant amounts of natural gas to customers in the Commonwealth of Independent States (CIS). In addition, Gazprom (through its subsidiary Gazexport) has shifted much of its natural gas exports to serve the rising demand in countries of the EU, as well as Turkey, Japan, and other Asian countries (see Table 3). Russian natural gas exports rose during 2004 from previous years, but the Ministry of Energy expects natural gas exports in 2005 to grow at a slower rate. Last year, Russia exported approximately 7.1 Tcf of natural gas, and Russian Energy Ministry data released at the beginning of 2005 forecasted exports of 7.2 Tcf for 2005. In recent months, Russia insisted on being paid higher prices for its natural gas exports to neighboring CIS countries.

**TABLE 3: Major European Recipients of Russian Natural Gas Exports, 2004**

Rank	Country	Imports (bcf/year)	Pct of Domestic NG Consumption
1	Germany	1110	44%
2	Italy	777	29%
3	Turkey	473	65%
4	France	470	26%
5	Hungary	378	72%
6	Finland	269	100%
7	Slovakia	261	100%
8	Poland	258	60%
9	Czech Republic	240	82%
10	Austria	201	63%
11	Bulgaria	184	94%
12	Romania	177	24%
13	Fmr Yugoslavia	74	-
14	Greece	74	92%
15	Switzerland	18	17%

**\*\*Does not include exports through Ukraine and Belarus**  
Source: EIA, BP (2005), CIS and E. European Energy Databook, 2005

As of late December 2005 Russia and Ukraine had not reached an agreement on natural gas supply prices for 2006, and on January 1, 2006, Gazprom shut off gas supplies to Ukraine, with supplies to Europe reportedly also being affected. Even though Russia has used the threat of a cutoff to demand higher natural gas prices in recent years, this was the first time that a supply disruption has affected flows to Europe. Eventually, Russia's natural gas company agreed to sell its natural gas to RosUkrEnergo, a trading company that also imports natural gas from Central Asia, at the market price of \$6.51/mcf (\$230 per thousand cubic meters). On January 4, 2006, Ukraine signed a five-year agreement to buy 580 Bcf of natural gas from RosUkrEnergo at \$2.69/mcf (comprised of less expensive natural gas from Central Asia). In 2005, Ukraine contracted to buy 812 Bcf at \$1.41/mcf. In turn, Russia agreed to pay Ukraine natural gas transit fees of 7.3 cents per thousand cubic feet per 100 miles, a 47 percent price increase from 2005. The contracts are also subject to review each year and may be adjusted to new market prices.

For Gazprom to fulfill its long-term aim of increasing European sales, it will need to boost its production, as well as to secure more reliable export routes to the region. In 1997, Gazprom began importing natural gas from [Turkmenistan](#) to help fulfill its supply contract with the Netherlands. Since then, Turkmenistan and Russia have had repeated disputes over the pricing of the natural gas resulting in a complete halt to natural gas supplies in 2004. Turkmenistan's January 2005 agreement with Russia guarantees initial natural gas exports of 212 bcf in 2005, drastically increasing to 2.4 Tcf in 2007, and remaining at 2.8 Tcf from 2009 to 2028. Turkmenistan maintains that the \$1.55/mcf price it agreed to is too low in comparison to the resale value of natural gas in European markets, and it wants to raise the price to \$1.76/mcf in 2006 and \$2.12/mcf in the following years.

Several proposed new export pipelines would serve European markets if constructed.

### Major Proposed Natural Gas Pipelines

#### *Yamal-Europe II*

The Yamal-Europe I pipeline (1 Tcf), which carries natural gas from Russia to Poland and Germany via Belarus, would be expanded another 1 Tcf under this proposal. Gazprom and Poland currently disagree on the exact route of the second branch as it travels through Poland. Gazprom is seeking a route via southeastern Poland to Slovakia and on to Central Europe, while Poland wants the branch to travel through its own country and then on to Germany.



#### *Blue Stream Expansion and Interconnection*

The Blue Stream natural gas pipeline connects the Russian system to [Turkey](#) through a 750-mile pipeline, 246 miles of which extends underneath the Black Sea (see map). Natural gas began flowing through the pipeline in December 2002, under an initial schedule of 71 Bcf per year, which was to increase by 71 Bcf annually. Even though flows through the pipeline totaled only 113 Bcf during 2004, the recent launch of a new gas compressor station in Russia will allow the pipeline to run at its design capacity of 565 Bcf per year. During 2005, roughly 160 Bcf of natural gas has been transported via Blue Stream. Gazprom is still discussing plans with its project partner Eni whether to construct an extension to Ceyhan or Izmir (in Turkey), where the gas could be liquefied for export. Another option is to access the planned 280-350 Bcf Poseidon pipeline, which will bring Caspian and Middle East gas to Italy via Turkey and Greece starting in 2010.

In March 2003, Turkey halted deliveries through Blue Stream, invoking a clause in the contract allowing either party to stop deliveries for six months. After Russia filed suit in Stockholm's International Arbitration court, the two sides came to an agreement in November 2003 and the supply of natural gas to Turkey resumed in December 2003.

#### *North Trans-Gas Pipeline (or North European Gas Pipeline)*

The idea of a North Trans-Gas pipeline, extending over 2,000 miles from Russia to Finland and the United Kingdom via the Baltic Sea, was proposed in June 2003 by Russia and the UK. About 700 miles of the pipeline will pass under the Baltic Sea. In September 2005, Gazprom, and Germany's BASF and E.ON signed a "basic" agreement on the construction of the pipeline, which would give the Russian major a 51 percent share in the project, with E.ON and BASF each owning 24.5 percent. The Netherlands has also expressed interest in being involved in the project. The project is expected to cost \$5.7 billion and to transport approximately 0.9-1.0 Tcf of natural gas beginning in 2010. A second pipeline, which would double the transmission capacity could be built if demand necessitates it.

The main advantage of this pipeline is Russia will no longer have to negotiate transit fees with nearly half a dozen countries or pay them in natural gas. A possible spur connection to Sweden has also been considered. Polish and Latvian leaders have expressed frustration that they were not included in the negotiations.

#### *Natural Gas for China*

The Kovytko natural gas field, 63 percent owned by TNK-BP, could provide China with natural gas in the next decade via a proposed pipeline (see map below). The project is expected to come online in 2006, but would only provide natural gas to local markets. China has stated it is ready to import up to 700 Bcf per year from the project; but since the natural gas would not arrive until



2012 at the earliest and since China is pursuing other natural gas import plans in the meantime, it is possible that Kovytko natural gas will not have a buyer. Russian Deputy Prime Minister Aleksandr Zhukov has expressed support for the plan, while Gazprom and CNPC have set up a strategic agreement to examine a pipeline's feasibility. According to statements during the Fall of 2005 from Gazprom, the company is still negotiating with TNK-BP on the extent to which TNK-BP would be involved in the export of the natural gas to China. Gazprom does not favor a direct link from Kovytko to China that is not a part of Gazprom's natural gas pipeline network. As a result, Gazprom may even delay development of the project because it anticipates that the field's potential output is much higher than local demand.



## Industry Structure

### Russia's Evolving Oil and Natural Gas Industry Structure

#### *Rosneft and its failed merger with Gazprom*

In 2005, several major events transformed the oil and gas industry in Russia. In September 2004, [Gazprom](#) announced plans to acquire, via a share swap, the 100 percent state-owned oil company, Rosneft. A completed Rosneft-Gazprom merger would have put the new company into competition with Lukoil, the country's largest oil producer. By 2005, however it was apparent that the merger would not be completed successfully due to Gazprom's fears that a merger would leave it open to litigation targeted towards Rosneft as a result of the "Yukos Affair" (see below).

#### *The 'Yukos Affair'*

On October 25, 2003, the Russian government arrested Mikhail Khodorkovsky, the CEO of Yukos, Russia's top oil producer, on charges of fraud and tax evasion. Since that time, the Russian government has arrested numerous other shareholders and top-level executives in the company for similar reasons. The government sought to recoup the cost of some of the allegedly questionable tax schemes used by Yukos by auctioning off 76.8 percent of the company's prime asset, Yuganskneftegaz, in late 2004. The subsidiary, which produces approximately 1 percent of the world's oil supply and 11 percent of Russia's oil supply, was auctioned off to an unknown company called Baikal Finans Group (BFG). A week later Rosneft, the state oil company, announced it would buy BFG for \$9.35 billion (with a loan partly financed by Chinese National Petroleum Corporation). Financial analysts concluded this price was far less than the unit's fair market value.

Another merger in the Russian energy industry introduced the participation of a new major Western oil company. In September 2004, ConocoPhillips announced a \$2.0 billion strategic alliance with OAO Lukoil, under which ConocoPhillips will buy a 7.6 percent stake in the Russian oil company and get a share in joint projects. Through stock purchases, ConocoPhillips increased its share of the company to 10 percent by November 2004, enough for it to receive one seat on the 11-member board of directors of Lukoil. The deal will provide ConocoPhillips access to Russia's oil and natural gas reserves and opens a possible avenue for it to become the first Western petroleum producer to return to Iraq. Under the strategic alliance, ConocoPhillips can opt to raise its stake to 20 percent within two to three years, which would cost about \$3 billion at current prices.

*The failed merger of Gazprom and Rosneft, the latent effects of the "Yukos affair", and Gazprom's acquisition of Sibneft continue to alter the structure of the Russian energy industry. The government has backtracked on the privatizations of the last decade, and has consequently brought key oil and gas assets under government control.*



The combination of Gazprom's acquisition of Sibneft and Rosneft's acquisition of Yuganskneftegaz puts approximately 25 percent of Russia's oil production into state hands.

#### *TNK-BP*

In 2003, British Petroleum (BP) completed its merger with the Russian oil company, Tyumen Oil Company, creating a new company called TNK-BP. The company holds oil reserves of 8 billion barrels (SEC estimate, others vary) and produced 1.5 million bbl/d from January-October 2005, making it Russia's second-largest oil producer (behind Lukoil). The deal also includes retail outlets in Russia and Ukraine. The company is also an equal partner with Gazprom in Slavneft, which currently produces roughly 500,000 bbl/d.

#### **Downstream/Refining**

Russia has 41 oil refineries with a total crude oil processing capacity of 5.44 million bbl/d. However, many of the refineries are inefficient, aging, and in need of modernization. With Russian domestic demand of 2.6 million bbl/d in 2004 (preliminary estimate), refining capacity far outstrips local demand for refined products. Because Russian refined product exports have a lower average price than crude oil, the Russian government reduced export taxes during the mid 1990s to allow for greater volumes of product exports. [Russian oil exports to the U.S.](#) (click for data table) have almost doubled since 2004, rising to almost 500,000 bbl/d of crude oil and products. Political pressures to maintain refinery operations, the need to pay for refinery modernization, and higher international oil product prices provide an incentive for Russian oil companies to continue favoring product exports. According to the draft plan for economic development during 2005-2008, the reconstruction and upgrading of refineries so that the refineries can convert a higher level of crude will be a priority for future oil refinery development. The draft foresees continued increases in the production of high quality light oil products, catalysts and raw material for the petrochemical industry. As production of fuel oil is reduced, local refineries are only meeting about half of the country's demand for high octane gasoline. Consequently, Russia must import the remainder.

#### **Natural Gas Industry Structure**

[Gazprom](#), Russia's state-run natural gas monopoly, holds nearly one-third of the world's natural gas reserves, produces nearly 90 percent of Russia's natural gas, and operates the country's natural gas pipeline network. Gazprom is also Russia's largest earner of hard currency, and the company's tax payments accounting for around 25 percent of federal tax revenues.

Despite its enormous size and significance, Gazprom is seriously encumbered by domestic regulation. By law, Gazprom must supply the natural gas used to heat and power Russia's vast domestic market at government-regulated prices (approximately \$28 per thousand cubic meters), regardless of profitability. Accordingly, roughly two-thirds of the company's revenue comes from its export sales to Europe, where natural gas is sold for around \$135-\$140 per thousand cubic meters. Because exported Russian natural gas accounts for approximately 25 percent of Europe's demand for natural gas, Gazprom is also one of Moscow's main foreign policy tools (see Table 1).

As Gazprom's trade relationship with European consumers grows, contentious issues have arisen. European trade representatives denounced Gazprom's monopolistic market position and two-tiered pricing system and linked the pricing issue to Russia's accession to the World Trade Organization (WTO) in response. In response to calls for fair pricing, the Russian government increased prices to industrial consumers (from \$0.79/million cubic feet to \$1.61/million cubic feet), yet this price level is still far less than half the prices charged at the German and Ukrainian borders.

Russia agreed to grant independent natural gas producers access to Gazprom's pipelines, but independents still hold a very small share of the market and have no access to international natural gas export infrastructure.

#### *"Ring Fence" Removal*

The government hopes that the removal of the "ring-fence", which limits foreign share ownership in the company, will finally allow Gazprom to raise much-needed investment capital. The consequences of a flawed reform package are serious. First, Gazprom provides subsidized gas to UES (Russia's electricity monopoly), meaning that price increases as part of a deregulation program could make gas unaffordable for the Russian populace—one-fifth of whom are below the poverty line. Also, the government receives 25 percent of its tax revenue from Gazprom, and breaking the company up could lead to similar problems in revenue collection seen in the oil sector. Finally, the creation of a deregulated gas sector, run by much wealthier individuals would inevitably further reduce the Kremlin's political control in the industry.

#### *Gazprom's Sibneft Acquisition*

In September 2005, Gazprom announced it would buy a 75 percent share of Sibneft for \$13.1

billion. Gazprom's purchase of the oil company, the fifth largest in Russia (representing roughly 665,000 bbl/d of production), marks its first major foray into the oil business. Yukos also owns 20 percent of the company, but this share may yet be seized by the courts. Gazprom's ability to pay for Sibneft was partially enabled by the state's purchase of a 10.7 percent share in Gazprom in June 2005 for \$7 billion. For the Russian gas company, the acquisition will enable it to diversify into other commodities and will allow it to obtain low-cost oil production, in relative terms, at around \$3 per barrel.

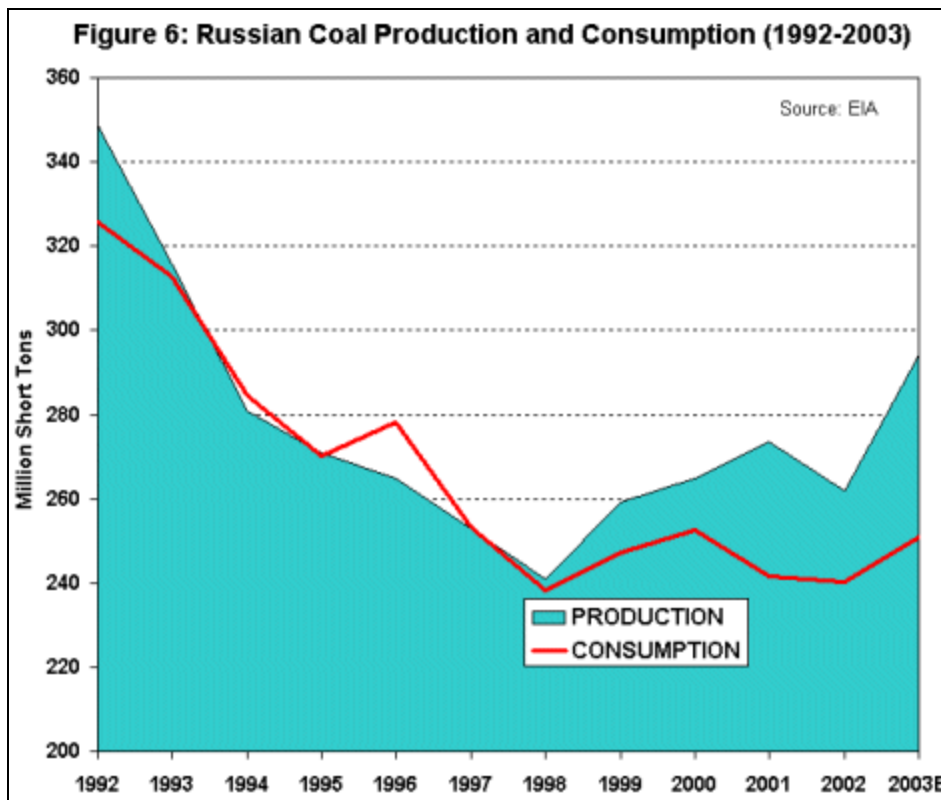
## Coal

**Russia has the second-largest amount of recoverable coal reserves in the world, and the Russian Energy ministry is optimistic about future growth. Safety concerns and adherence to the Kyoto protocol could hinder the industry's potential.**

With 173 billion short tons, Russia holds the world's second largest recoverable coal reserves, behind only the United States, which holds roughly 274 billion short tons. However, years of poor management during the Soviet era, and a sharp decline in demand for coal during the early 1990s, significantly undermined the Russian coal sector.

Between 1996 and 2001, Russia worked with the World Bank to restructure the country's coal industry. As a result, the state monopoly, formally known as RosUgol, has been dissolved, and roughly 77% of domestic coal production comes from independent producers. Russian coal production began a three-year upswing in 1999. After a slight decline in 2002, production rebounded in 2003, and in 2004 Russian energy ministry sources estimate total coal production was 308.6 million short tons (roughly one-third of U.S. coal production).

According to the government's energy strategy, Russia should produce between 441 and 496 million short tons by 2020. The government has high hopes for the future of the coal industry. Exports of coal and coke from CIS countries to non-CIS countries rose a staggering 60% between 2002 and 2003, and recent articles in the trade press expect rising coal demand (especially in Asia) to continue. However, various problems may hinder the industry's development potential. Russia's agreement to the Kyoto Protocol may lower utility sector demand for coal. In a recent BBC interview, the governor of the Kemerovo Region, which is responsible for over half of the country's coal production, voiced concerns over his region's ability to sustain coal production growth. He noted his region had already seen almost 200 rivers ruined after being used for mining activities. These environmental problems may hinder Russia's desire to keep increasing coal production.



## Electricity

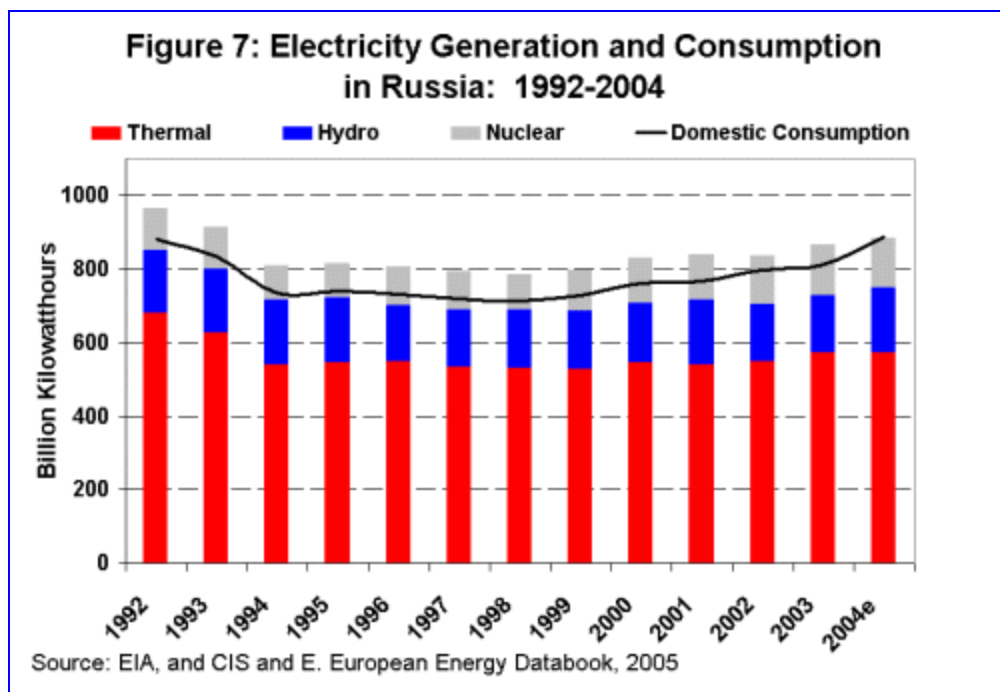
### Generation Sector

**Russia's energy sector is in dire need of investment and repair. After the blackout in Moscow in May 2005, plans for**

Russia's power sector includes over 440 thermal and hydropower plants (approximately 77 of which are coal-fired) plus 31 nuclear reactors. A few generators in the far-eastern part of the country are not connected to the power grid.

**electricity reform have become more uncertain. Major reforms are likely to be delayed until after the presidential election in 2008.**

The system has a total electric generation capacity of 205.6 gigawatts (GW), with 2003 output of approximately 850.6 billion kilowatt hours (Bkwh). Since the collapse of the Soviet Union, electricity generation showed both a dramatic decline, (down 18% between 1992 and 1999), followed by a gradual recovery (up 8% between 1999 and 2004). Similar to patterns in oil, natural gas, and coal, the Soviet Union's collapse also stunted electricity generation. Economic recovery contributed to an increase in total electricity consumption from 715 Bkwh in 1998, to roughly 812 Bkwh in 2003.



Thermal power (oil, natural gas, and coal-fired) accounts for roughly 63 percent of Russia's electricity generation, followed by hydropower (21%) and nuclear (16%), (see Fig. 5, [data](#)). The Russian government has stated that it intends to expand the role of nuclear and hydropower generation in the future to allow for greater export of fossil fuels. Russia has an installed nuclear capacity of 21.2 million kilowatts, distributed across 31 operational nuclear reactors at 10 locations, all west of the Ural Mountains. However, Russia's nuclear power facilities are aging. Fifty percent of the country's 31 nuclear reactors use the RBMK design employed in Ukraine's ill-fated Chernobyl plant. The working life of a reactor is considered to be 30 years: nine of Russia's plants are between 26 and 30 years old, and six are between 21 and 25 years old.

By 2010, Russia plans to construct five new units at existing facilities throughout the country. In November 2005, Russia installed a fourth turbine at the Bureya Hydroelectric Station in the Amur Province in the east, adding another 335 MW to the existing 670 MW. The first three units were installed during 2003-2004, and Russia hopes that the project will enable it to relieve electricity shortages in the Far East and begin more substantial exports to China. The Russian Ministry of Atomic Energy predicts that, by 2020, nuclear generation could reach 300 bkw per year, more than double the 2003 level. However, many plants are due for decommissioning and meeting this target will require between \$5 and \$10 billion per year of investment over the next decade.

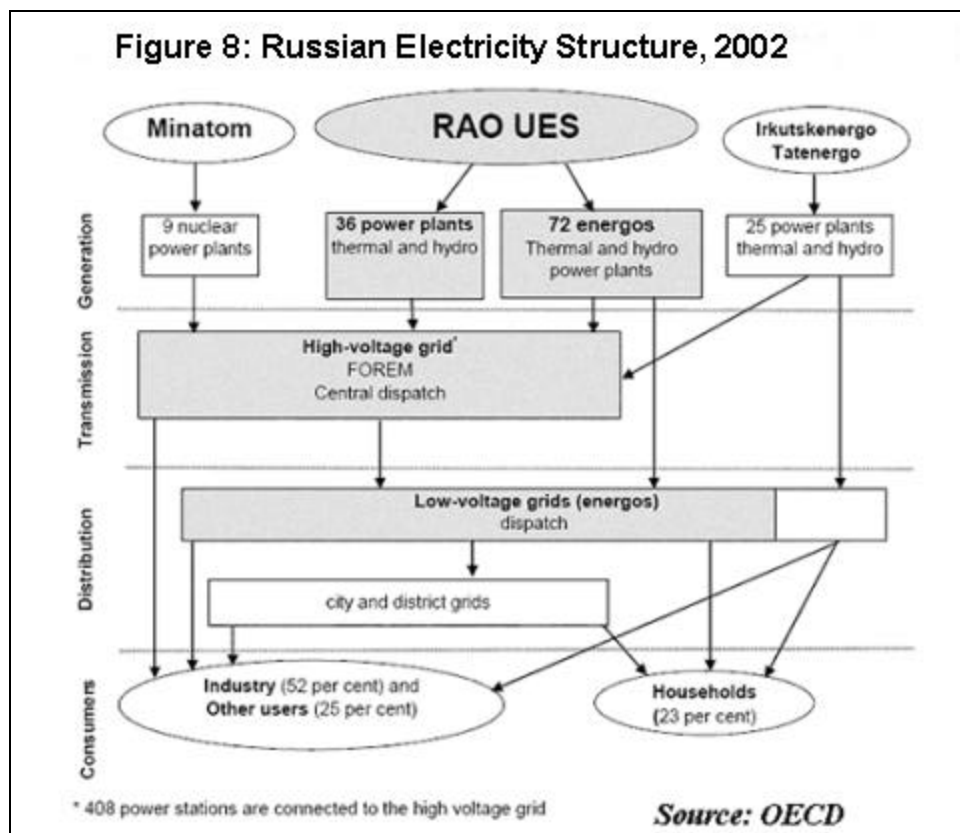
Besides nuclear generation, the Russian government has also made hydroelectric generation a priority, particularly in the country's Far East, where provision and delivery of electricity supply can be problematic. In June 2003, a representative from the country's largest generation owner, [Unified Energy System of Russia \(UES\)](#), told reporters that the company plans to invest \$14 billion in the development of Russia's hydroelectric sector, particularly in Siberia and the Far East.

#### *Transmission and Distribution Sector*

There are seven separate regional power systems in the Russian electricity sector: Northwest, Center, Middle Volga, North Caucasus, Urals, Siberia, and Far East. The Far East region is the only one not connected to an integrated power system. UES, which is 52 percent owned by the Russian government (Gazprom now has a 10% stake), controls most of the transmission and distribution in Russia. [UES](#) owns 96 percent of the transmission and distribution system, the central dispatch unit, and the federal wholesale electricity market (FOREM). The grid comprises almost 2 million miles of power lines, 93,000 miles of which are high-voltage cables over 220 kilovolts (Kv).

*Privatization and Electricity Market Reform*

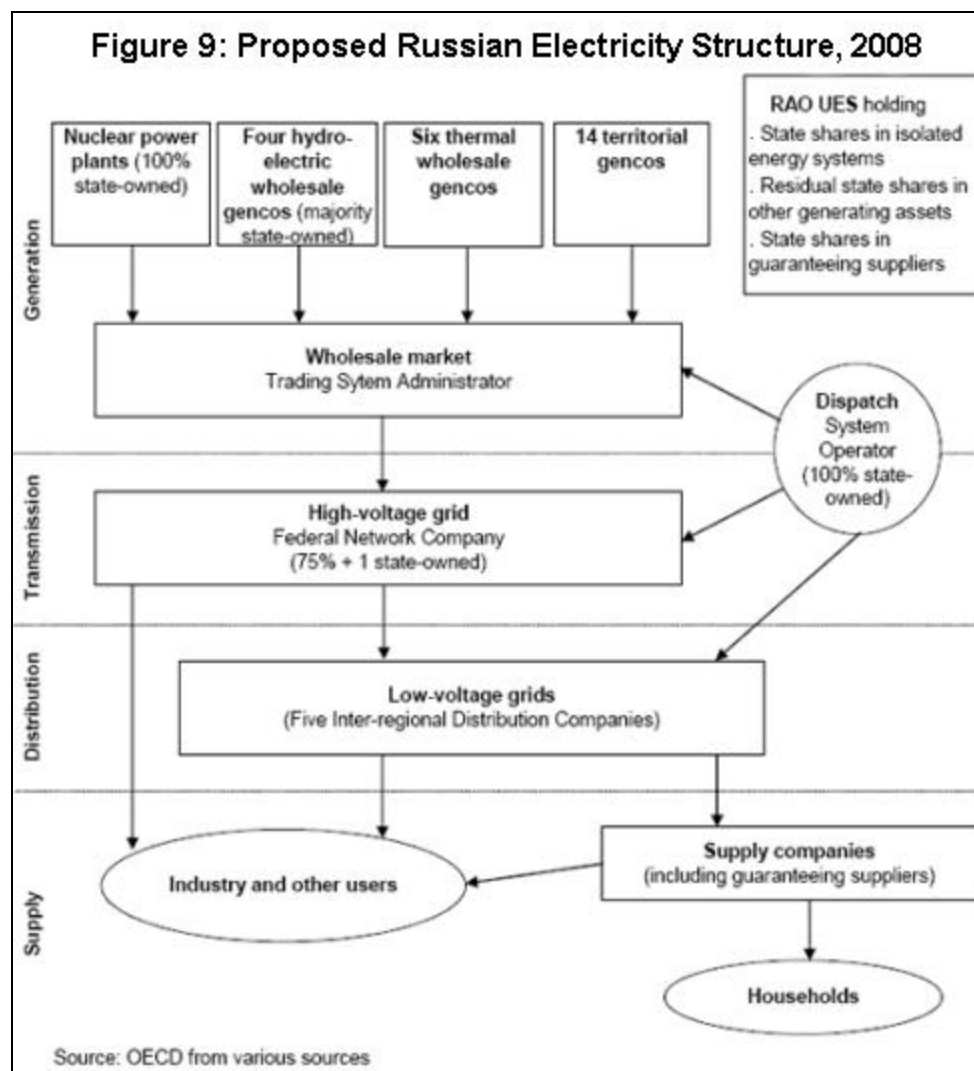
Currently, wholesale competition and choice of electricity supplier are nonexistent for consumers in Russia, but this will change under the new plan when implementation begins in 2007. In December 2004 Viktor Khristenko, the energy minister, announced a delay of at least 12 to 18 months in the first sale of electricity generation assets, a key part of power-sector reform, increasing concerns among foreign investors that the country's energy reforms are not progressing as originally planned. According to Khristenko, preparing the assets for sale could take until at least 2006. After a fire at a 40-year old substation caused large power failure in Moscow in May 2005, the government pressed criminal charges against UES, and the country called for UES-head Anatoly Chubais' resignation. This incident is resulting in delays to the industry reform process because it creates uncertainty within the structure of UES and its management practices.



As part of the reform begun in March 2004, Russian President Vladimir Putin signed six bills into law that aim to substantially reform the industry. Under the new laws, tariff rates on the domestic market are to be made more universal instead of geographically-specific; Recently, however, the government has backtracked and will not be raising retail prices at all until after the next presidential election in 2008. The reform also calls for UES's generation and distribution facilities to be privatized, but the country's transmission grid will remain under state control.

The main goal of the Russian electricity reform package is to create a generating sector divided into multiple wholesale electricity companies (commonly called "OGKs"), which participate in a new competitive wholesale market. In November 2003 Russia officially launched a partial wholesale market, which is referred to as the "5-15" model. The market, so-named for Russia's pledge to deregulate 5-15 percent of the country's electricity sector, serves as a trading center mostly for UES regional entities. The creation of 10 OGKs, each of which will own portions of the Russian generation sector, is the foundation for the sector's privatization. Russia's delay in deciding on a privatization strategy for the OGKs has pushed the privatization timetable into 2005-2006. Some of Russia's wholesale generation companies have been auctioned off, with Gazprom buying the assets. To date, Gazprom has already bought a 10.3 percent share in UES and a 25 percent share in Mosenergo (another generation company).

Under the new plan the distribution sector will stay divided into regional monopolies. The new regional distribution companies will function as guaranteed suppliers to all customers. Also, bilateral contracts between generators and customer are and will continue to be mandatory at fixed prices set by the government. (See 'Proposed Russian Electricity Structure (2008)', below).



### Electricity Exports

Russia exports significant quantities of electricity to the countries of the former Soviet Union, as well as to China, Poland, Turkey and Finland. UES also has plans to export electricity to Iran and possibly Afghanistan and Pakistan from two hydroelectric stations it is currently building in Tajikistan. There are currently two efforts underway to integrate the Russian and Western European electricity grids. UES is participating in the Baltrel program, designed to create an energy ring of power companies in the Baltic states. Also, the Union for the Coordination of Transmission of Electricity (UCTE), of which 20 European countries are members, has entered into discussions with Russian colleagues over the technological and operational aspects of interconnecting their systems. In October 2003, officials representing Russia and the European Union agreed to develop plans for the full integration of their respective power grids by 2007, and a recent EU-Russia energy dialogue reported the start of a joint feasibility study on the integration of the two power systems.

## Environment

After years of neglect under the Soviet Union, the environment has become a significant issue in Russia today. Soviet policies that encouraged rapid industrialization and development left a legacy of air pollution and nuclear waste with which Russia now is struggling to contend. The country's energy and carbon intensities remain high and have only decreased marginally since the Soviet Union collapsed. In addition, despite the objections of nascent environmental groups, the post-Soviet Russian government has passed legislation to facilitate the permanent storage of other countries' nuclear waste on Russian territory. Although environmental awareness in Russia is rising, the cost of remediating the country's environmental hot spots is high, and the Ministry of Natural Resources has a limited budget. As a result, cleanup has been slow.

In November 2004, Russia ratified the [Kyoto protocol](#) on climate change. The Protocol now enters into force since it has met the threshold of being ratified by at least 55 countries that account for at least 55 percent of 1990's developed country greenhouse gas (GHG) emissions. The Protocol's targets become legally binding commitments for ratifying countries. Since the fall of the Soviet Union, Russia's GHG emissions have fallen by about a third. Consequently, Russia



should not have difficulty meeting its Kyoto target and could earn billions of dollars by selling back the difference between its emissions targets (set in 1990) and its actual emissions.

## Maps

FSU Energy Map (click for a high resolution version):



(Source: CIA)

### Major Pipelines to Europe:



(Source: CIA)

### Major Russian oil basins



## Source: IEA.

### Bosporus Bypass Options (please click below for a full map)





Other Non-U.S. Government Maps:

[University of Texas: Perry-Castaneda Map Collection: Link to Detailed Map of Caspian Sea \(North Region\)](#)

[University of Texas: Perry-Castaneda Map Collection: Link to Detailed Map of Caspian Sea \(South Region\)](#)

[University of Texas: Perry-Castaneda Map Collection: Link to Detailed Map of Caspian Sea \(Legend\)](#)

## Profile

### Country Overview

<b>Chief of State</b>	Vladimir Vladimirovich Putin (acting president since December 31, 1999, president since May 7, 2000); re-elected March 2004
<b>Head of Government</b>	Mikhail Fradkov (since March 2004)
<b>Location</b>	Northern Asia (that part west of the Urals is included with Europe), bordering the Arctic Ocean, between Europe and the North Pacific Ocean
<b>Independence</b>	24 August 1991 (from Soviet Union)
<b>Population (2005E)</b>	143,420,309
<b>Languages</b>	Russian, many minority languages
<b>Religion</b>	Russian Orthodox, Muslim, other
<b>Ethnic Group(s)</b>	Russian 79.8%, Tatar 3.8%, Ukrainian 2%, Bashkir 1.2%, Chuvash 1.1%, other or unspecified 12.1% (2002 census)

### Economic Overview

<b>Net Exports (2005)</b>	\$129 Billion
<b>Current Account Balance (2005)</b>	\$98.4 Billion

### Energy Overview

<b>Minister of Energy</b>	Viktor Borisovich Khristenko
<b>Proven Oil Reserves</b>	60 billion barrels

(January 1, 2005E)

**Oil Production (2005E)** 9,440.5 thousand barrels per day, of which 95% was crude oil**Oil Consumption (2005E)** 2,719 thousand barrels per day**Crude Oil Distillation Capacity (2005E)** 5,432.8 thousand barrels per day**Proven Natural Gas Reserves (January 1, 2005E)** 1,680 trillion cubic feet**Natural Gas Production (2003E), (2004E)** 21.8 trillion cubic feet (tcf), 22.4 tcf**Natural Gas Consumption (2003E), (2004E)** 15.3 Trillion cubic feet (tcf), 15.3 tcf**Recoverable Coal Reserves (2003E)** 173,073.9 million short tons**Coal Production (2003E)** 294 million short tons**Coal Consumption (2003E)** 250.7 million short tons**Electricity Installed Capacity (2003E)** 214.4 gigawatts**Electricity Production (2003E)** 883.3 billion kilowatt hours**Electricity Consumption (2003E)** 811.5 billion kilowatt hours**Total Energy Consumption (2003E)** 29.1 quadrillion Btus\*, of which Natural Gas (53%), Oil (19%), Coal (16%), Hydroelectricity (6%), Nuclear (5%), Other Renewables (0%)**Total Per Capita Energy Consumption (2003E)** 202.9 million Btus**Energy Intensity (2003E)** 23,239.9 Btu per \$2000-PPP\*\*

## Environmental Overview

**Energy-Related Carbon Dioxide Emissions (2003E)** 1,606.4 million metric tons, of which Natural Gas (52%), Coal (26%), Oil (22%)**Per-Capita, Energy-Related Carbon Dioxide Emissions (2003E)** 11.2 metric tons**Carbon Dioxide Intensity (2003E)** 1.3 Metric tons per thousand \$2000-PPP\*\***Environmental Issues** air pollution from heavy industry, emissions of coal-fired electric plants, and transportation in major cities; industrial, municipal, and agricultural pollution of inland waterways and seacoasts; deforestation; soil erosion; soil contamination from improper application of agricultural chemicals; scattered areas of sometimes intense radioactive contamination; groundwater contamination from toxic waste; urban solid waste management; abandoned stocks of obsolete pesticides**Major Environmental Agreements** party to: Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulfur 85, Antarctic-Environmental Protocol, Antarctic-Marine Living Resources, Antarctic Seals, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Wetlands, Whaling signed, but not ratified: Air Pollution-Sulfur 94

## Oil and Gas Industry

**Organization** Transneft is predominant pipeline operator. State has majority ownership of Gazprom and Rosneft.**Major Oil/Gas Ports** Primorsk, Novorossiysk

\* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

\*\*GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

## Links

### EIA Links

[EIA - Country Information on Russia](#)

[EIA – International Energy Outlook, 2005 \(Table E2: World Oil Production Capacity 1990-2025\)](#)

[EIA – Selected oil and natural gas infrastructure of the Former Soviet Union \(Map\)](#)

### U.S. Government

[U.S. Agency for International Development](#)

[U.S. Department of Commerce, Business Information Service for the Newly Independent States \(BISNIS\)](#)

[U.S. Department of Commerce, Business Information Service for the Newly Independent States \(BISNIS\) - Sakhalin Region](#)

[U.S. Department of Commerce, Country Commercial Guides](#)

[U.S. Department of Commerce, International Trade Administration: Energy Division](#)

[U.S. Department of Commerce, Trade Compliance Center: Market Access Information](#)

[U.S. Department of Commerce: Gazprom's Natural Gas Projects in Northwest Russia](#)

[CIA World Factbook](#)

[U.S. Department of Energy, Office of Fossil Energy: International Affairs](#)

[Library of Congress Country Study on the former Soviet Union](#)

[Radio Free Europe/Radio Liberty \(RFE/RL\)](#)

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[European Union: Energy Strategy of the Russian Federation to the year 2020](#)

[Gazprom](#)

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[Interfax News Agency](#)

[International Atomic Energy Agency \(IAEA\) Power Reactor Information System](#)

[Lonely Planet World Guide](#)

[The Moscow Times](#)

[Prime-Tass](#)

[RusEnergy](#)

[Russia Journal](#)

[Russia Today](#)

[Russian Energy Monthly](#)

[Sakhalin Energy](#)

[Law on Subsoil Legislation](#)

[University of Texas - Russian and East European Network Information Center](#)

[United Nations Framework Convention on Climate Change and the Kyoto Protocol](#)

[The Washington Post](#)

[World Bank- Russian Infrastructure and Energy](#)

[Embassy of the Russian Federation in the United States](#)

[Russian Energy Ministry \(in Russian\)](#)

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U.S. Energy Information Administration

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